Claims

[c1] A method of ultrasound inspection, said method comprising:

providing a composite first part;

introducing ultrasound to the first part;

receiving reflections of the ultrasound introduced to the first part; and

predicting a residual strength of the first part using an amplitude of the

received reflections.

[c2] A method according to Claim 1 wherein predicting a residual strength

comprises correlating an amplitude of at least one received reflection of at least

one second part with at least one non-ultrasound test of the second part.

[c3] A method according to Claim 2 wherein predicting a residual strength

comprises correlating the amplitude of the received reflections of at least one

second part with at least one destructive test of the second part.

[c4] A method according to Claim 3 wherein predicting a residual strength

comprises correlating the amplitude of the received reflections of at least one

second part with a core sample test of the second part.

[c5] A method according to Claim 1 wherein predicting a residual strength

comprises correlating an amplitude of a received reflection of a plurality of

second parts with at least one non-ultrasound test of each of the second parts.

[c6] A method according to Claim 5 wherein correlating an amplitude comprises

generating a linear least squares fit between the amplitudes and a plurality of

results from the non-ultrasound tests.

[c7] A method according to Claim 1 wherein predicting a residual strength

comprises predicting a residual shear strength of the first part using an

amplitude of the received reflections.

[c8] A method according to Claim 7 wherein predicting a residual shear strength

comprises correlating an amplitude of a received reflections of a plurality of

second parts with at least one non-ultrasound shear strength test of each of the

second parts.

[c9]   A method according to Claim 8 wherein correlating an amplitude comprises generating a linear least squares fit between the amplitudes and a plurality of results from the non-ultrasound shear strength tests.

[c10]   A ultrasound inspection system comprising:

a pulse echo transducer; and

a processor operationally coupled to said transducer, said processor configured to predict a residual strength of a first part using an amplitude of a received ultrasound reflection.

[c11]   A system according to Claim 10 further comprising a memory containing a correlation of an amplitude of at least one received reflection of at least one second part with at least one non-ultrasound test of the second part, said processor further configured to predict a residual strength of the first part using an amplitude of a received ultrasound reflection and the correlation.

[c12]   A system according to Claim 10 further comprising a memory containing a correlation of an amplitude of at least one received reflection of at least one second part with at least one destructive test of the second part, said processor further configured to predict a residual strength of the first part using an amplitude of a received ultrasound reflection and the correlation.

[c13]   A system according to Claim 10 further comprising a memory containing a correlation of an amplitude of at least one received reflection of at least one second part with a core sample test of the second part, said processor further configured to predict a residual strength of the first part using an amplitude of a received ultrasound reflections and the correlation.

[c14]   A system according to Claim 10 further comprising a memory containing a correlation of an amplitude of a received reflection of a plurality of second parts with at least one non-ultrasound test of each of the second parts, said processor further configured to predict a residual strength of the first part using an amplitude of a received ultrasound reflections and the correlation.

[c15]   A system according to Claim 14 wherein said memory further contains a linear lest squares fit between the amplitudes and a plurality of results from the non-

ultrasound tests.

[c16]   A system according to Claim 10 wherein said processor further configured to predict a residual shear strength of the first part.

[c17]   A system according to Claim 16 further comprising a memory containing a correlation of an amplitude of a received reflection of a plurality of second parts with at least one non-ultrasound test of each of the second parts, said processor further configured to predict a residual shear strength of the first part using an amplitude of a received ultrasound reflections and the correlation.

[c18]   A system according to Claim 17 wherein said memory further contains a linear lest squares fit between the amplitudes and a plurality of results from the non-ultrasound tests.

[c19]   An ultrasound inspection device comprising:
means for non-destructively testing a first part; and
means for predicting a residual strength of the first part using a result from a non-destructive test of the first part with a plurality of destructive and non-destructive tests on second parts substantially similar to the first part.

[c20]   A device according to Claim 19 wherein said means for predicting a residual strength comprise means for predicting a residual shear strength of the first part comprising an aircraft first part using a result from a non-destructive test of the first part with a plurality of destructive and non-destructive tests on second aircraft parts substantially similar to the aircraft first part.